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Analyticity, Necessity and Apriority¹

R. G. SWINBURNE

This paper seeks to investigate the extent of overlap between the analytic, the necessary, and the *a priori*.

'Analytic' is a philosopher's term, and different philosophers have given different definitions of it. For Kant who introduced the term, an 'analytic judgment' is one in which 'the predicate B belongs to the subject A, as something which is (covertly) contained in this concept A'.² The judgment adds 'nothing through the predicate to the concept of the subject, but merely (breaks) it up into these constituent concepts that have all along been thought in it, although confusedly'. A synthetic judgment, in contrast, was one in which 'B lies outside the concept A'. Kant's classification of judgments, or, as we should say, statements or propositions, was only meant to apply to 'judgments in which a relation of a subject to the predicate is thought'. For this reason later philosophers have considered Kant's definition too narrow.³ They have felt intuitively that the kind of distinction which Kant made had application not merely within the class of subject-predicate propositions but within the wider class of all propositions. They therefore sought to define such a distinction. A large number of definitions have been provided, but I would claim that basically they fall into three groups.⁴ Of these, I argue, definitions of the first type seem inherently unsatisfactory; definitions of the second and third types can both be made satisfactory, and when tidied up, some definitions of the two types prove to be equivalent.

1 I am grateful to colleagues at Keele for their helpful criticisms of an earlier version of this paper.

2 I. Kant *Critique of Pure Reason* A 6-7, B 10 (translated N. Kemp Smith, London, 1929).

3 There are difficulties too in Kant's talk of one concept 'containing' another. See F. Waismann 'Analytic-synthetic' republished (from *Analysis*) in his *How I see Philosophy* (London, 1968), pp. 122-207. See pp. 122 ff.

4 In 'The Analytic-Synthetic Controversy' (*Australasian Journal of Philosophy*, 50 (1972), 107-123) D. A. T. Gasking distinguishes (p. 108) 'nine traditional definitions of analyticity'. Of these the ninth is of my first type, the first two are of my second type, and the others of my third type. In 'The A Priori and the Analytic' (*Proceedings of the Aristotelian Society*, 64 (1963-64), 31-54) Anthony Quinton distinguishes (pp. 32 f.) 'four main interpretations' of 'analytic'. His second interpretation is Kant's, his fourth is of my first type, and his first and third are of my second type.

A definition of the first type defines an analytic proposition by reference to the notions of logical truth and synonymy. For example, Quine considers the suggestion that an analytic proposition is one which 'can be turned into a logical truth by putting synonyms for synonyms', a logical truth being 'a statement which is true and remains true under all reinterpretations of its components other than the logical particles'.¹ Against this, there stands, first, Quine's objection that no satisfactory definition of synonymy has ever been given. I do not find this a compelling objection. Two expressions are 'synonymous' if and only if they 'mean the same', a phrase common enough in non-philosophical talk. So long as we can say often enough whether or not two expressions mean the same, a failure to provide a definition in other terms would not seem a drawback. It seems to me that we can often enough say just this. Synonymy may be context-relative; if it is, then the definition should permit only substitution of expressions synonymous in the context in question.²

There are however two substantial connected difficulties with a definition of this type. The first concerns the notion of logical truth. This is defined by reference to 'logical particles', and these are either enumerated, or defined (roughly) as words which have application in any context, i.e. 'topic-neutral' words. If they are enumerated, the resulting definition of the analytic seems intolerably *ad hoc*—why to be analytic does a proposition have to be reduced to one in which just *those* particles alone are invariant? But the definition of 'logical particle' is incredibly woolly. No word at all has application in literally *any* context—'if' only has application if we are talking about possibilities, and 'all' only if we are talking about all the members of some class. And if 'if' and 'all' are classified as logical particles, why not 'when', 'after', 'on top of', 'material body', 'thought', 'feeling' . . . where do you stop? Quinton has attempted to meet this difficulty by explaining topic-neutrality in terms of implicit definability. He defines 'a

- 1 W. V. O. Quine, 'Two Dogmas of Empiricism' in his *From a Logical Point of View*, second edition, Harper Torchbook edition (New York, 1963), pp. 22 f. A definition of this type is suggested by Frege. See G. Frege, *The Foundations of Arithmetic*, tr. J. L. Austin (Oxford, 1953), p. 4.
- 2 As Waismann pointed out (op. cit. pp. 133 ff.) you need to substitute not merely synonymous words but synonymous sentences in order to reduce many propositions to truths of logic. Even if 'planet' is synonymous with 'body which moves round the sun', 'planets move round the sun', can only be reduced to a truth of logic if we can substitute for it the synonymous sentence 'everything which is a planet is a body which moves round the sun'.

logical term as one whose meaning is wholly specified by implicit definitions'.¹ To understand 'later than', or 'on top of', he would claim, ostensive definition of some sort is necessary; hence, these expressions are not purely logical terms. 'Not', 'and', 'if', and perhaps 'more ϕ than'² are, however, introduceable by mere implicit definition. Unfortunately however Quinton gives no definition of 'implicit definition'. However a natural definition (which, I suggest, brings out what Robinson wants to say about it in his book on Definition³) is the following. An implicit definition of a term ' ϕ ' is a process which conveys the meaning of ' ϕ ' by producing sentences (? sentences expressing analytic propositions) in which ' ϕ ' is correctly used. (If we write 'sentences expressing analytic propositions' instead of 'sentences' the definition of course becomes viciously circular.) But on this very natural definition of 'implicit definition', surely any word whatever can have its 'meaning wholly specified by implicit definition'. Given a rich enough vocabulary, you can convey the meaning of 'red' or 'constant' or 'leather', etc., etc., by producing sentences which use those words correctly. And if your vocabulary is too poor, not even 'not', 'and', and 'if' can have their meaning conveyed in this way. I conclude that Quinton's attempt to distinguish logical truths in terms of logical particles is a failure.

Besides this objection, there is a further objection to the proposed definition of an 'analytic proposition'. This is that, although this is a wider definition than Kant's, there are many propositions which, many would feel intuitively, are true for much the same reasons as propositions classified by this definition as analytic, and which yet do not on it fall into the analytic category—typically, for example, 'nothing is red and green all over'.⁴

1 Op. cit. p. 49.

2 Quinton's attempt (p. 50) to show that 'more ϕ than' is a logical term runs into a difficulty. He admits that 'the principles of asymmetry and transitivity do not wholly fix the sense of "more ϕ than" since they remain necessarily true if "less ϕ than" is substituted and "more" and "less" do not mean the same'. He then goes on to claim that 'however this objection is to be dealt with it does not show "more ϕ than" to be a non-logical term. For the difference between "more" and "less" must be as topic-neutral as they are'. But that will not do at all. For Quinton has expounded topic-neutrality in terms of implicit definability, and unless further principles of implicit definition beyond the principles of asymmetry and transitivity can be found which distinguish between 'more' and 'less', then 'more ϕ than' is not a logical term on Quinton's account of logical terms.

3 R. Robinson, *Definition* (Oxford, 1950), pp. 106 ff.

4 Quinton seems to suggest (op. cit. p. 51) that 'nothing can be red and green all over' is reducible to 'nothing can be a member of two species

A definition of the second type defines an analytic proposition by reference to its deriving its truth solely from the meanings of words (or semantic rules). Some definitions of this type have been expressed very unhappily in the past. Thus Ayer: 'a proposition is analytic when its validity depends solely on the definitions of the symbols it contains.'¹ Since arguments rather than propositions are normally said to be valid, let us substitute 'truth' for 'validity' in the definition. The more substantial difficulty is that it is not clear which symbols a proposition contains since sentences containing different symbols may express the same proposition. So let us try the following amendment: 'a proposition is analytic if and only if any sentence which expresses it expresses a true proposition and does so solely because the words in the sentence mean what they do.' The fact that the words mean what they do, that is, is by itself sufficient to make the statement true—how rocks are arranged on Mars or the Romans behaved in Gaul, etc., etc., does not affect the truth value. This seems to me a perfectly satisfactory definition. A Quinean might say that we need a satisfactory definition of 'meaning' before we can use this definition, but that is false. The notion of words having this or that meaning has a natural home in non-philosophical talk and needs no elucidation from the philosopher in order to enable us to recognize cases of sentences which expresses true propositions solely because the words in them mean what they do. Recognizing such cases is, I suggest, something which we can often do.

A definition of the third type defines an analytic proposition in terms of the self-contradictoriness or incoherence of its negation. One such definition is that an analytic proposition is one whose 'negation is self-contradictory'. If it is meant by this that the negation has to be explicitly of the form 'p and not-p', then this definition is obviously far too narrow—even 'all bachelors are unmarried' fails to come out as analytic. But if the self-contradictoriness of the negation needs only be implicit we need to be told how it is to be recognized. This point suggests the following amended definition: 'a proposition is analytic if and only if its negation entails an explicitly self-contradictory proposition' (i.e. a proposition which says that something is the case and that it is

of a genus' which is a truth which implicitly defines its terms. But even if the latter suggestion were in some sense true (and it seems to me highly implausible) it seems clear that no mere substitution of synonymous expressions will effect the 'reduction'.

I A. J. Ayer, *Language, Truth and Logic*, 2nd edition (London, 1946), p. 78.

not the case, that is a statement of the form 'p and not-p' such as 'it is blue and it is not blue').¹ By this test 'all bachelors are unmarried' comes out as analytic. Assuming the existential commitment of 'all' the entailment can be demonstrated as follows. 'It is not the case that all bachelors are unmarried', entails 'some unmarried men are not unmarried' which entails that there are certain persons, call them x's such that 'x's are unmarried and it is not the case that x's are unmarried'. (If the existential commitment of 'all' is not assumed, a different deduction will make the point.) To apply this definition you need to have explained to you the meaning of 'entails' and 'negation' as well as the meaning of 'self-contradictory proposition'. I have already explained the meaning of 'self-contradictory proposition'. The task is easy enough for the other two terms. The negation of a proposition is a proposition which says that things are not as the former proposition says. A proposition p entails a proposition q if and only if p is not consistent with the negation of q, i.e. the claim that q is buried within the claim that p. This can be spelt by many obvious examples which should make clear the senses of 'consistent' and 'buried' involved. There is every reason to suppose that in consequence of this learning process men will agree in the vast majority of cases, though no doubt not in all, as to when a statement is analytic on the definition being discussed.

An alternative definition in the same tradition is: 'a proposition is analytic if and only if its negation is not coherent'. I understand by a coherent proposition one which it makes sense to suppose is true; one such that we can conceive of, that is imagine or suppose, it and any other proposition which is entailed by the original proposition, being true. The latter clause is important for bringing out the sense of coherence involved. We want to say that it is analytic that $\sqrt{4}=2$. But it is conceivable that $\sqrt{4}=2$ and also conceivable that $\sqrt{4}\neq 2$. For what can be believed is conceivable and schoolboys sometimes believe that $\sqrt{4}=2$ and sometimes believe that $\sqrt{4}\neq 2$. But $\sqrt{4}\neq 2$ entails that $2\times 2\neq 4$ and so that $2+2\neq 4$ and so that $1+1+1+1\neq 4$ and so that $3+1\neq 4$ —which is not conceivable. A man could not suppose that ' $3+1\neq 4$ ' expressed a true proposition if he understood by the

1 This account of analytic propositions has its origin in the account which Leibniz gives of truths of reason. These are those propositions which, by analysis, can be resolved into 'identical propositions, whose opposite contains an express contradiction', *Monadology*, pp.33-35 (Leibniz' *Philosophical Writings*, translated by Mary Morris, London, 1934).

terms used what we understand by them, e.g. understood by '4' the number next after 3, and so he cannot conceive of the proposition which we express by ' $3 + 1 \neq 4$ ' being true. (Of course in order to derive from ' $\sqrt{4} \neq 2$ ' what is entailed by it, we need to know the language of mathematics, the rules for operating with mathematical symbols—and schoolboys often do not know those very well.)

I believe that the two definitions of the third type given above are equivalent, in the sense that any proposition which satisfies the one will satisfy the other. Clearly if a proposition p entails a self-contradictory proposition then p is incoherent for it has buried in it a claim that something is so and that it is not so—and it is not conceivable that things should be thus. The converse needs a longer proof. There are a limited number of propositional forms which logicians have codified. A proposition will state that an object has a certain property or that a certain relation holds between two certain objects, or that there exists an object with such and such properties. Now take a proposition of one of these forms, for example a proposition ascribing a property to an object. Such a proposition will have the form ' ϕ is ψ '. If such a proposition is incoherent, then being ϕ must be being an object of a certain sort being which is incompatible with having the property of being ψ . For if there were no incompatibility between being the sort of thing which is ϕ , and the sort of thing which can be ψ , how could there be any incoherence in a thing being both? So there is an incompatibility between being ϕ and being ψ , and so there will be buried within ' ϕ is ψ ' a contradiction which can be brought to the surface by deriving from it what is entailed by the proposition. Examples bear out this point. Take a typically incoherent proposition of the above form, e.g. 'Honesty weighs 10 lbs'. 'a is honesty' entails 'a is not a physical object' (Physical objects and honesty, one may say loosely, are different kinds of thing.) 'a has weight' entails 'a is a physical object' (Only a physical object, something with spatial location, is the kind of thing that can have weight). Hence 'honesty weighs ten pounds' entails 'there is something which both is and is not a physical object', that is a self-contradictory proposition. This type of argument can clearly be generalized for propositions of other forms to show generally that if a proposition is incoherent it entails a self-contradictory proposition. Hence the two definitions of the third type are equivalent.

I now proceed to argue further that the two definitions of the third type are equivalent to the definition which I proposed of the second type. I will take the definition in terms of coherence in order to show this. On this definition a proposition p is analytic if and only if its negation is incoherent. Now whether a proposition is coherent or incoherent is solely a matter of what it says—the fact that it says what it does, is alone sufficient to make it coherent, or incoherent, as the case may be. So the fact that the negation of an analytic proposition p says what it does, that $\text{not-}p$, is alone sufficient to make it false. That being so, that fact that p says what it does is alone sufficient to make it true. That a sentence expresses the proposition it does is a consequence solely of what the words in the sentence mean. If p is true just because of what it says, then any sentence which expresses it will express a true proposition solely because the words in the sentence mean what they do. Hence if a proposition is analytic on the definition of the third type, it will be analytic on the definition of the second type. Conversely, if a proposition is analytic on the latter definition, any sentence which expresses p will express a true proposition and do so solely because the words in it mean what they do. In that case the fact that p is true is a consequence merely of what it says. Hence that the negation of p , that is $\text{not-}p$, is false, is also a consequence merely of what it says. So the assertion of the negation will be in words which have such a meaning that the falsity of the negation lies buried in them. Hence the assertion of the 'negation contains its own falsity buried within it and so is incoherent. Hence any proposition analytic on the definition of the second type will be analytic on the definition of the third type also.

I conclude that there is at least one useful definition of 'analytic' of the second type and two of the third, and that these are equivalent. I suspect that any usable definition of 'analytic' which was not evidently too narrow, and which was moderately faithful to the original intuition behind the delimitation of the class, would prove to be equivalent to the definitions which I have favoured. I shall henceforward operate with these definitions. A synthetic proposition is then naturally defined as any proposition other than an analytic proposition or the negation of an analytic proposition. I emphasize again that in order to apply these definitions we have to understand the terms which occur in them. I claim that these terms are either terms which have a perfectly regular

use in non-philosophical discourse or terms which can be defined by terms of the former type, at any rate with the help of examples.

What next of necessity? In ordinary talk whether a proposition is rightly termed 'necessary' depends very much on the context. We may naturally and truly say 'In order to get from London to Paris in less than four hours it is necessary to go by air' or 'to obtain social security benefits it is necessary to fill in a form'. The necessity is relative to a set of assumptions which form the context of utterance. In the first case these are that the only ways of getting to Paris are the normal commercial alternatives (air, or combinations of boat/hovercraft with rail/bus). In the second case these are that social security benefits are allocated in accordance with law and administrative directive. The same considerations apply to the use of cognate terms such as 'must', 'got to', 'have to', 'cannot but', etc. Such propositions as 'I have to go to London next week' or 'he must have called while I was out' may be true—yet the truth of such propositions derives in part from the contextual assumptions which are naturally made. Now of many things which we would ordinarily wish to say are necessary, philosophers who use 'necessary' in their technical discussions would wish to deny the necessity. It therefore becomes them to state what are the assumptions against the background of which they are asserting necessity or the sense in which they are using the term 'necessary'. Unlike 'analytic' and '*a priori*', 'necessary' is not a term coined by philosophers. If philosophers give it a special use they have to say what it is.

Kant gives us no help. He uses the term 'necessary' without explanation. Philosophers often say that their interest in necessity is in logical necessity and they then define 'logically necessary' either as equivalent in meaning to 'analytic' or in such a way that the logically necessary becomes a proper sub-class of the analytic. We saw earlier that Quine suggested a definition of the latter kind, according to which a proposition was 'logically true'—which I take as equivalent to 'logically necessary'—if and only if it is true and remains true under all reinterpretations of the components other than logical particles. Propositions such as 'if it is raining, it is raining' and 'Either it is raining or it is not raining' are often supposed to come out as logically necessary under this definition, while propositions such as 'all bachelors are unmarried', although analytic, are not logically necessary under this definition. You need to substitute synonymous expressions in

order to turn the latter into a logical truth. We saw earlier the unsatisfactoriness of a definition of a logical truth of the type which Quine considers. I know of no other type of definition according to which the logically necessary comes out as a proper sub-class of the analytic. The alternative which is taken by many philosophers is to use 'logically necessary' as a synonym for 'analytic'. Some philosophers go further and state or take for granted the equivalence of analyticity with necessity simpliciter, which gives us a first usable defining criterion of 'necessary proposition':

(A) A proposition is necessary if and only if it is analytic.

Such an account however reduces to triviality a philosopher's claim that the only necessity which there is is that of analytic propositions. It seems to beg the interesting questions. A number of writers of recent and not so recent years have suggested as examples of necessary propositions propositions which are almost certainly not analytic. Their suggestions that the propositions which they cite are necessary seem to have a certain plausibility. I shall attempt to delineate alternative defining criteria for 'necessary propositions', which yield alternative ways of understanding necessity, according to one or more of which the propositions which the various writers cite could be classed as necessary.

My second defining criterion for a 'necessary proposition' is the following:

(B) A proposition is necessary if and only if it is incoherent to suppose that the individuals in fact picked out by the referring expressions in the sentence which expresses it do not have the properties and/or relations claimed by the proposition.

I understand by a referring expression either any proper name, or a definite description which picks out the individual or individuals which the proposition is 'about'. In either case the proposition will presuppose rather than state the existence of the individuals referred to. Propositions are often 'about' individuals, attributing to them properties or actions. 'The President will be away next week' is about the President, and 'His boss is very irritable' is about the boss. It is of course sometimes unclear which constituents of sentences pick out the individuals which they are about. Is 'among those who called last week was the representative from the trade union' about the representative or not? Sometimes

only the context can reveal, and sometimes not even that can reveal. But the undoubted fact that it is sometimes not clear which, if any, expressions are referring expressions does not call into question the equally undoubted fact that it is often clear enough which expressions are referring expressions.

As an example of a proposition necessary on criterion (B) but not on criterion (A) we may take:

- (1) The number which is the number of the planets is greater than 6.

The negation of (1) is the proposition that states that the number which is the number of the planets is not greater than 6. This seems to be a coherent proposition, given the understanding of coherence outlined earlier. Yet the referring expression 'The number which is the number of the planets' in fact picks out the number 9 and it is not coherent to suppose that 9 is no greater than 6. So (1), though not analytic, seems necessary on criterion (B). The converse situation is illustrated by:

- (2) The author of Hamlet wrote Hamlet.

The negation of (2) is the proposition which states that the author of Hamlet did not write Hamlet and that is incoherent. On the other hand it is clearly coherent to suppose that the person in fact picked out by 'the author of Hamlet', i.e. Shakespeare, in fact did not write Hamlet. Although it is necessary that whoever wrote Hamlet wrote Hamlet, it is by no means necessary that the man who actually did should have done so. So (2), although analytic, is not necessary on criterion (B). It is easy to construct other examples of the same pattern as (2). Although 'the Prime Minister is Prime Minister' cannot but be true, the Prime Minister might never have become Prime Minister—he might have become a professional musician instead.

It is Kripke¹ more than anyone else² who in the last year or two has drawn our attention to the complexity of examples such as (1) and (2)—although his concern has been somewhat more with the possibility of propositions being necessary without being *a*

1 See his 'Identity and Necessity' in (ed.) M. K. Munitz, *Identity and Individuation*, New York, 1971 and 'Naming and Necessity' in (ed.) D. Davidson and G. Harman, *Semantics of Natural Languages*, Dordrecht, 1972.

2 But see also A. Plantinga, 'World and Essence', *Philosophical Review*, 79 (1970), 461–492; and Baruch A. Brody, 'Why settle for anything less than good old-fashioned Aristotelian essentialism?', *Nous*, 7 (1973), 351–365, for work along similar lines to Kripke's.

priori (and conversely) than with the possibility of propositions being necessary without being analytic (and conversely). But Kripke does not in his discussion provide precise definitions of the terms involved—'necessary', 'analytic', and '*a priori*'.¹ I have attempted to provide a criterion of necessity—criterion (B)—which will, I suggest, classify as necessary many of those propositions which Kripke wishes to call necessary. Apart from (1) above, (3), (4) and (5) below are examples of propositions of different kinds which, Kripke suggests, we might wish to classify as necessary.

(3) Nixon is a person.²

(4) The lectern in front of Kripke was not from the very beginning of its existence made of ice.³

(5) Tully is Cicero.⁴

On the assumption that (3), (4) and (5) are true, Kripke wishes to claim that they are necessary. (3) is necessary, Kripke suggests, because nothing would be Nixon unless that thing were a person. Nixon only exists as long as he is a person. (4) is necessary because a lectern would not be *that* lectern if it had always been made of ice. (5) is necessary because 'Tully' and 'Cicero' in fact pick out the same person and that person must be identical with himself.

If we adopt criterion (B) of necessity, it seems highly plausible to suppose that at any rate (4) and (5) are necessary propositions. (5) is necessary because it is not coherent to suppose that the individual picked out by both 'Cicero' and 'Tully' is not self-identical. As regards the lectern in front of Kripke we can imagine different things having happened to it from the things that actually happened; but this is imagining things happening to the lectern which was in fact continuous with the lectern in front of Kripke. So one can imagine that lectern having been turned into ice at some earlier time. But it is not coherent to suppose that *that* lectern has always been made of ice, for (given that that lectern never has been made of ice) that would not be a supposition about the lectern in fact continuous with Kripke's lectern. (3) is a more dubious case—could not Nixon turn into a chimpanzee and remain Nixon?—but if we do regard it as necessary, it is surely

1 See the discussion on pp. 260–264 of 'Naming and Necessity'.

2 'Naming and Necessity', pp. 268 ff.

3 'Identity and Necessity', p. 152.

4 'Identity and Necessity', pp. 156 ff.

because we do not find it coherent to suppose that the individual who is Nixon be anything other than a person.

Necessity of type (B) seems to be the necessity to which Kripke is drawing our attention. If that is so there is no need to read anything too deeply metaphysical into Kripke's necessity. Like necessity of type (A), necessity of type (B) arises because there are limits to what can be coherently thought. If a referring expression is to pick out an individual, there have to be criteria which distinguish that individual from others. Hence it will not be coherent to imagine that individual not satisfying those criteria. It is from that incoherence that type (B) necessity arises.

A further sense of 'necessary' is suggested by the writings of some recent writers on the philosophy of religion. They have interpreted the claim that God is a necessary being as the claim that he is not dependent for his existence on anything else.¹ This suggests the following defining criterion of a necessary proposition:

(C) A proposition *p* is necessary if and only if it is true, but its being true is not (was not, or will not be) brought about by anything, the description of which neither entails nor is entailed by *p*.

By (C) of course all analytic propositions such as 'all bachelors are unmarried' come out again as necessary. They do not depend for their truth on anything the description of which neither entails nor is entailed by them. 'All bachelors are unmarried' does not depend for its truth on the genetic characteristics or social habits of bachelors. You may want to say that it depends for its truth on all unmarried men being unmarried. But then the description of that fact, the proposition 'all unmarried men are unmarried' entails 'all bachelors are unmarried'. If traditional theism is true, 'there is a God' is also necessary by criterion (C). This is because, given traditional theism, God's existence does not depend on anything else—unless you count such things as the existence of an omnipotent being as something else. But the description of such things constitutes a proposition which entails or is entailed by 'there is a God'. If theistic views are false, 'the Universe exists' is no doubt a necessary proposition. If atoms were indestructible and there were exactly ten billion billion of them, then 'there are

1 See, for example, John H. Hick ('Necessary Being', *Scottish Journal of Theology* 14 (1961), 353–369), and R. L. Franklin ('Some Sorts of Necessity', *Sophia*, 3 (1964), 15–24), both of whom have written along these lines.

ten billion billion atoms' would be a necessary proposition by criterion (C).

Another way in which 'necessary' has been understood in the past—although it may seem to us an unnatural one—is this. A being is said to be a necessary being if he is by nature eternal and unperishable. The scholastics called the angels and the stars necessary beings for this reason. A being is 'by nature' eternal and unperishable if it will continue to exist for ever, and never decay—but for divine action. For the scholastics God differed from other necessary beings in being an 'unconditioned' necessary being—i.e. unlike them, he did not owe his necessary existence to anything else. The scholastics did not so naturally apply the term 'necessary' to propositions, but their use of 'necessary' can easily be given application to propositions. We can say that:

(D) a proposition is necessary if and only if it is a tensed proposition, describing truly how things are now which always will be true and always has been true since the first moment at which it was true.¹ (If we wish to provide an account as close as possible to the scholastic, we can add 'but for the supernatural action of God', but I ignore this complication).

The word 'tensed' is important. All true tenseless propositions such as 'In 49 B.C. Caesar crosses the Rubicon' or 'In A.D. 1973 there are nine members of staff of the Keele philosophy department' are eternally true. Most true tensed propositions, such as 'Mary is sitting' or 'John is ill' are not however eternally true. But if the universe will always exist in future (whether or not God keeps it in existence), and the universe has never ceased to exist, then 'the universe exists' is a necessary proposition in sense (D). So too is 'there are atoms' if there are atoms, there have never ceased to be atoms, and there always will be atoms hereafter. Any tensed analytic proposition comes out as necessary by criterion (D). But on both criteria (C) and (D) of 'necessary' not all necessary propositions are analytic.

I have distinguished four alternative criteria for being a necessary proposition; there are, I suspect, further kinds of proposition

1 Anthony Kenny ('God and Necessity' in (ed.) B. Williams and A. Montefiore, *British Analytical Philosophy*) has a slight variant in the scholastic tradition on this criterion. He uses a criterion according to which a tensed proposition is a necessary proposition if it does not change its truth-value, i.e. is always true or always false.

which it would not be odd to term 'necessary'. For example, we can have a criterion for being a necessary proposition according to which a (tenseless) proposition is necessary at this or that time, e.g.:

(E) A proposition *p* is necessary at a time *t* if and only if *p* is true and it is not coherent to suppose that any agent by his action at or subsequent to *t* can make *p* false.

Then true propositions about events at some time become necessary on criterion (E) when that time is past—given that it is incoherent to suppose that agents can by their actions affect what is past. All analytic propositions come out as necessary on this criterion also, but of course the converse does not hold.

Necessary propositions are contrasted with 'contingent' ones. A natural definition of a contingent proposition is that a contingent proposition is any proposition which is not necessary and is not the negation of a necessary proposition. Each way of understanding 'necessary' then has a different way of understanding 'contingent' contrasted with it.

What finally of the *a priori*? An *a priori* proposition is one which can be known *a priori*, one of which *a priori* knowledge can be had. Kant understood by '*a priori* knowledge, not knowledge independent of this or that experience but knowledge absolutely independent of all experience'.¹ Modern philosophers who have been so prolific in their definitions of 'analytic' have not in general attempted rival definitions of '*a priori*' to Kant's. They have usually used the term in a somewhat Kantian sense without precise definition, or they have simply equated '*a priori*' with 'necessary'—an equation which appears to beg interesting questions in this field. Writers who have made this equation have appealed to the text of Kant as justification for doing so. Quinton writes that one meaning of '*a priori*' is 'following Kant, necessary'.² I do not myself find this equation in the text, at any rate the text of the Introduction to the *Critique of Pure Reason* in the second edition. There are there arguments to show that if we know a necessary truth we know it *a priori*.³ The rest of the *Critique* assumes that all *a priori* truths are necessary. But it does

1 Op. cit. Bz.

2 Op. cit. p. 32.

3 Jonathan Bennett (*Kant's Analytic*, Cambridge, 1966, p. 9) claims that 'the context [of the Introduction] clearly implies that necessity and universality are entailed by apriority as well as entailing it', but I cannot myself see that the context does imply this.

not seem to me that Kant rules out the possibility of necessary truths which are not knowable *a priori* because they are not knowable at all. (There might be necessary truths about the noumenal world unknowable by any being.)

There seem to me to be at least three senses of *a priori* which might be distilled from Kant's discussion and subsequent use of the term. They are:

- (a) A proposition is *a priori* if and only if it can be known to be true by an agent who has had no experiences at all.
- (b) A proposition is *a priori* if and only if it can be known by an agent to be true, his claim to knowledge being irrefutable by any (coherently describable) experiences.
- (c) A proposition is *a priori* if and only if it is necessary and can be known to be necessary.

If a proposition satisfies (a) it will satisfy (b), for if it can be known to be true in advance of experience, it can be known that no subsequent experience will upset it. But if a proposition satisfies (b) it need not therefore satisfy (a), for it might be knowable only through having some experience. If a proposition satisfies (c), it will satisfy (b). For if an agent knows that a proposition is necessary (in any of the senses described) he knows that his subsequent experience will not refute it. However, there is no reason to suppose that a proposition which satisfies (c) (in any of the senses of 'necessary') need satisfy (a). For even if a man knows a proposition to be necessary, there is no reason to suppose that he could have come to have that knowledge without any experience at all.

Does satisfaction of (a) or (b) entail satisfaction of (c)? That depends in part on the sense in which 'necessary' is to be understood. However if it is understood in any of senses (A), (B), (C), or (D), satisfaction of (b) does not entail satisfaction of (c). For one proposition which can be known by an agent and is irrefutable by any coherently describable experiences is the proposition that there are experiences. Yet this is not necessary in any of senses (A), (B), (C) or (D).

I shall not discuss whether satisfaction of (a) entails satisfaction of (c), or indeed discuss definition (a) further. This is because (a) seems to be not a very useful definition of '*a priori*' at all. For in the view of the vast majority of philosophers human beings do not in fact have any knowledge before they have some experience

of the world. Kant explicitly affirms this view. He writes that 'there can be no doubt that all our knowledge begins with experience. For how should our faculty of knowledge be awakened into action did not objects affecting our sense partly of themselves produce representations. . . . In the order of time therefore we have no knowledge antecedent to experience, and with experience all our knowledge begins.'¹ One could of course consider whether logically possible beings could know certain things in advance of experience. Before we did so, we would need to define 'experience' rather carefully—Is a being who reflects on the meaning of 'bachelor' having an experience or not? But I do not think that an elaboration of '*a priori*' along these lines would be of much use in elucidating its normal use, for most philosophers have used the term profitably without it occurring to them that they were making claims about the states of beings who have had no experiences at all. Kant certainly did not think of '*a priori*' in this way.

That leaves us with (b) and (c). What Kant meant by 'knowledge absolutely independent of all experience' is knowledge which comes to us through experience but is not contributed by experience. Although our knowledge that all bachelors are unmarried comes to us through experience (by reading books, hearing people talk, etc.), it is not contributed by experience. But how are we to recognize the knowledge that is not contributed by experience? Kant's answer is that 'necessity and strict universality are . . . sure criteria of *a priori* knowledge, and are inseparable from one another'.² In effect he proposes my definition (c), and this seems to me a definition which will have the consequence of classifying as *a priori* the propositions which most philosophers would judge to be *a priori*. Most philosophers would not wish to classify 'there are experiences' as *a priori*. Nevertheless if we do adopt definition (c), we should bear in mind that the adoption of this stipulated definition does not immediately rule out the possibility of agents having all sorts of knowledge of contingent matter of fact which they do not in some sense derive from their experience of the world.

So then an *a priori* proposition is a necessary proposition which can be known to be such. I do not add 'by man' to the definition (though Kant might have wished to) in view of complexities to which that would lead—e.g. the need to settle whether a being of enormous powers would be a man. In what sense is 'necessary' to

1 Op. cit. B1.

2 Op. cit. B4.

be taken in this definition? Different definitions would result from taking 'necessary' in different senses. But the only definition—if the sense of 'necessary' is to be taken from among those which I have delineated¹—which will yield as members of the class of *a priori* propositions roughly those and only those propositions which philosophers generally have wished to call *a priori* is the definition which takes 'necessary' in sense (A) as 'analytic'. Philosophers would be very unhappy about calling 'the number which is the number of the planets is greater than 6' or 'there are atoms' *a priori* propositions, even though they might admit that they were necessary in senses (B)² and (C) respectively, and could be known to be so. I therefore suggest that we take 'necessary' in the definition of *a priori* in sense (A). That definition then becomes:

A proposition is *a priori* if and only if it is analytic and can be known to be such.

This definition does have the unfortunate disadvantage of making the answer to Kant's big question whether there are any synthetic *a priori* propositions trivially obvious. I have reached this result however only through having an understanding of 'analytic' much wider than Kant's. It will be seen that many of the propositions which Kant or later writers have wished to classify as synthetic *a priori* come out as analytic on my understanding of 'analytic'.³ Examples are ' $5 + 7 = 12$ ', 'a straight line is the shortest line joining its end points', and 'nothing can be red and green all over'.

Our definition of *a priori* suggests various definitions of *a posteriori*. A natural one is the following: an *a posteriori* proposition is any contingent proposition which, if true, can be known to be true. ('Contingent' is here understood in the sense of 'synthetic'.)

On our definition of *a priori*, since not all propositions necessary

1 It is of course possible that some defining criterion of necessity, other than those which I have delineated would also yield a class of *a priori* propositions which contained as members roughly those, and only those, propositions which philosophers have generally wished to call *a priori*.

2 Kripke's papers set out to show that there are many propositions necessary in his sense which are not *a priori*.

3 Some of Kant's candidates for the status of synthetic *a priori* propositions are of course more tricky, I have argued elsewhere that 'every event has a cause' and 'there is only one space' are not analytic and hence by the above definition not *a priori*. For the former see my 'Physical Determinism' in (ed.) G. N. A. Vesey, *Knowledge and Necessity*, London, 1970, and for the latter see chapter 2 of my *Space and Time*, London, 1968.

in senses (B), (C), (D) and (E) are analytic, not all such propositions are *a priori*. However all *a priori* propositions are analytic. All analytic propositions are necessary in senses (C) and (E) (and tensed analytic propositions are necessary in sense (D)). Hence all *a priori* propositions are also necessary in senses (C) and (E) (and, if tensed, in sense (D)). Not all *a priori* propositions are necessary in sense (B), since as we have seen, some propositions which we know to be analytic are not necessary in sense (B). Clearly all *a priori* propositions are necessary in sense (A), that is analytic. But are all analytic propositions *a priori*, that is can all analytic propositions be known to be such? Now of course many analytic propositions may be so complex that man cannot recognize them to be analytic. But could there be an analytic proposition in which the analyticity was so deeply buried that no rational being could recognize the analyticity?

A proposition *p* is analytic if and only if its negation, not-*p*, entails an explicitly self-contradictory proposition. So a rational being would be able to know of any analytic proposition *p* that it was analytic if he could deduce from not-*p* the explicitly self-contradictory proposition entailed by it. But a rational being of sufficient ability could always deduce from a proposition any proposition entailed by it, and so could always come to know of any proposition not-*p* which entailed an explicitly self-contradictory proposition that it did so. Hence a rational being of sufficient ability could always come to know of any analytic proposition *p* that it was analytic.

Against this it might be argued that in some cases an infinite number of logical steps might be needed to get from not-*p* to the self-contradictory proposition; and in such cases, although the entailment existed, it could not be shown to exist by a rational being in a finite time—a rational being could not in a finite time run through the infinite number of logical steps needed to deduce the self-contradictory proposition. 'Every even number is the sum of two primes' (Goldbach's Conjecture) may be an analytic truth, although no one has yet proved it to be so. To show it to be so you would need to be able to show that 'not every even number is the sum of two primes' entailed a self-contradictory proposition. But there might be no general proof that it did so. The self-contradiction might consist in the contradiction involved in the conjunction of 'not every even number is the sum of two primes' with the infinite conjunction of analytic propositions

asserting of each even number that it is the sum of two primes and the proposition that the numbers referred to are all the even numbers that there are. (These propositions if analytic are entailed by any proposition including 'not every even number is the sum of two primes'). To prove the infinite conjunction you might need to prove for each of the infinite number of even numbers separately that it was the sum of two primes.

But, although, as in this case, an infinite number of logical steps would need to be traversed to prove that a proposition entailed a self-contradiction, I do not see why a rational being of sufficient ability could not perform the task in a finite time. Contrary to Zeno, agents can often perform an infinite number of actions of certain types in a finite time. They can, for example, perform the infinite number of actions which constitute traversing the infinite number of smaller and smaller intervals involved in running a mile, in a finite time.¹ They can run in a finite time first half a mile, then a quarter of a mile, then an eighth of a mile... etc., etc... all in five minutes. In a similar way to perform an infinite number of proofs in a finite time, you would need to take less and less time on each proof. Each proof would take a finite time, as of course it would need to—for to prove something involves passing from a state of ignorance to one of knowledge and that takes time. If there is some minimum finite time (say 1/10 second) needed for a certain agent to perform a proof, then that agent cannot perform an infinite number of proofs in a finite time. No doubt there is such a time for man and so he cannot perform an infinite number of proofs in a finite time. But there might be agents who could perform a proof in an interval of time smaller than any interval you like to name and such agents would appear to be able to run through an infinite number of proofs in a finite time.

I conclude that a rational being of sufficient ability could always come to know of any analytic proposition that it was analytic. My original claim withstands the objection discussed in the last two paragraphs. I conclude that all analytic propositions are *a priori* (though man may well be unable ever to detect the analyticity of some analytic propositions).

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¹ See Adolf Grünbaum, *Modern Science and Zeno's Paradoxes*, London, 1968. Grünbaum's discussion on pp. 90 ff. of 'The Peano Machine' has special relevance to our topic.